

APPROVAL OF MANUFACTURER CERTIFICATE

Certificate No:
AMMM00000ES
Revision No:
1

This is to certify:

That

Ruhrtaler Gesenkschmiede F.W. Wengeler GmbH & Co. KG
Feldstr. 1, 58456 Witten, Nordrhein-Westfalen, Germany

is an approved manufacturer of
Steel Forgings

in accordance with
DNVGL-OS-E302 – Offshore mooring chain, Edition July 2018

and the following particulars:

Product	Forgings for offshore mooring chain cable accessories
Grades	R3S, R4, R4S, R5
Max. weight	See page 2
Delivery Condition	See page 2
Remark	The approval is limited to chain cable accessories manufactured by Schmiedestück-Vertrieb Feuerstein GmbH

Manufacturer approved by this certificate is accepted to deliver according to DNV GL, DNV and GL rules. Materials to be applied to DNV GL classed object shall fulfill the material requirements in the applicable DNV GL class rules.

Issued at **Høvik** on **2019-09-17**

for **DNV GL**

This Certificate is valid until **2022-06-30**.

DNV GL local station: **Essen**

Approval Engineer: **Shylate Mahachi**

Hanne Anita Hjerpetjønn
Head of Section



Job Id: **263.11-004707-2**
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Particulars of the approval

Particular of approvals for offshore mooring chain cable accessories			
Grade ²⁾	Delivery conditions ¹⁾	Max. diameter or thickness [mm] ⁴⁾	Material manufacturer ³⁾
R3S	NQT	84	Deutsche Edelstahlwerke GmbH, Witten plant
R4	NQT	84	Deutsche Edelstahlwerke GmbH, Witten plant
R4S	NQT	84	Deutsche Edelstahlwerke GmbH, Witten plant
R5	NQT	84	Deutsche Edelstahlwerke GmbH, Witten plant

Remarks:

¹⁾ NQT: Normalizing, Quenched and Tempered. Final heat treatment is carried out in accordance with the approval of finished accessory manufacturer Schmiedestück-Vertrieb Feuerstein GmbH

²⁾ For approved material specification see table S1

³⁾ The approval is limited to the listed raw material manufacturer

⁴⁾ Max. diameter refers to nominal chain size of finished accessory manufactured by Schmiedestück-Vertrieb Feuerstein GmbH

Table S1 - Specification for chemical composition - Offshore mooring chain cable accessories													
Grade, thickness [mm]			C	Si	Mn	P	S	Cr	Ni	Mo	Cu	Al	N
R3S R4	84 ²⁾	Min	.26	-	.50	-	-	1.80	1.80	.30	-	.020	-
		Max	.34	.40	.80	.025	.015	2.20	2.20	.50	.25	.050	.015
R4S	84 ²⁾	Min	.26	-	.50	-	-	1.80	1.80	.30	-	.020	-
		Max	.34	.40	.80	.025	.015	2.20	2.20	.50	.25	.050	.015
R5	84 ²⁾	Min	.26	-	.50	-	-	1.80	1.80	.30	-	.020	-
		Max	.34	.40	.80	.025	.015	2.20	2.20	.50	.25	.050	.015

Remarks:

¹⁾ The content of Sn, Sb, As and B may be required. In such cases, the maximum content shall be 0.020 % for Sn, 0.020 % for Sb, 0.030% for As and 0.0007% for B.

²⁾ Deutsche Edelstahlwerke GmbH, Witten plant